

CLAIMS

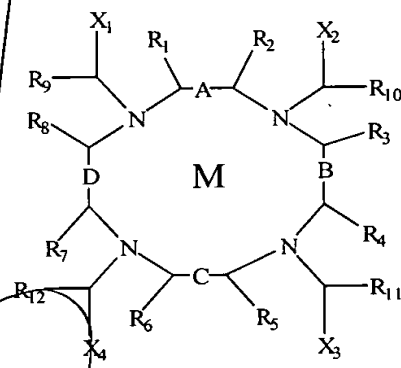
We claim:

1. An MRI agent comprising:

- a) a Gd(III) ion bound to a chelator such that said Gd(III) ion has coordination atoms in at least 5 coordination sites of said Gd(III) ion;
- b) a blocking moiety covalently attached to said chelator which hinders the rapid exchange of water in the remaining coordination sites;

wherein said blocking moiety is capable of interacting with a target substance such that the exchange of water in the remaining coordination sites is increased.

2. An MRI agent having the formula:



wherein

M is a paramagnetic metal ion selected from the group consisting of Gd(III), Fe(III), Mn(II), Yt(III), Cr(III) and Dy(III);

A, B, C and D are either single bonds or double bonds;

X₁, X₂, X₃ and X₄ are -OH, -COO-, -CH₂OH -CH₂COO-, or a blocking moiety;

R₁ - R₁₂ are hydrogen, alkyl, aryl, phosphorus moiety, or a blocking moiety;

wherein at least one of X₁-X₄ and R₁ - R₁₂ is a blocking moiety.

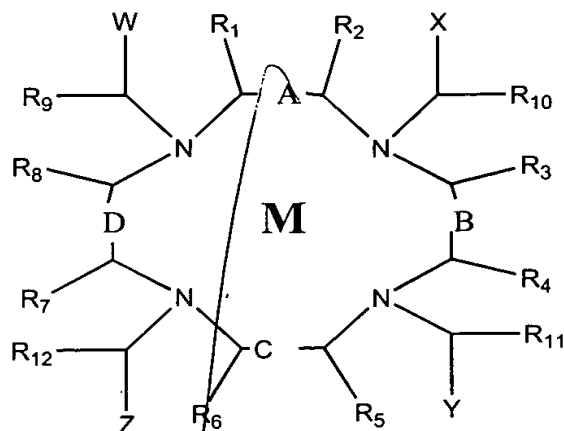
3. An MRI agent comprising:

- a) at least a first paramagnetic metal ion bound to a first complex, said first complex comprising:
 - i) a first chelator; and
 - ii) a blocking moiety covalently attached to said first chelator which binds in at least a first coordination site of said first metal ion and which is capable of interacting with a target substance such that the exchange of water in at least said first coordination site of said first metal ion is increased; and
- b) at least a second paramagnetic metal ion bound to a second complex, said second complex comprising:

- i) a second chelator; and
ii) a blocking moiety covalently attached to said second chelator which binds in at least a first coordination site of said second metal ion and which is capable of interacting with a target substance such that the exchange of water in at least said first coordination site of said second metal ion is increased.

4. An MRI agent comprising at least a first MRI duplex moiety comprising:
a) a first chelator comprising a first paramagnetic metal ion;
b) a second chelator comprising a second paramagnetic metal ion;
c) a blocking moiety covalently attached to at least one of said first or said second chelators, said blocking moiety providing at least a first coordination atom of each of said first and said second metal ions and which is capable of interacting with a target substance such that the exchange of water in at least a first coordination site in at least one of said metal ions is increased.
5. A composition comprising a polymer comprising at least one covalently linked MRI contrast agent comprising a paramagnetic metal ion bound to a complex, said complex comprising:
a) a chelator; and
b) a blocking moiety covalently attached to said chelator which binds in at least a first coordination site of said metal ion and which is capable of interacting with a target substance such that the exchange of water in at least said first coordination site is increased.
6. A MRI agent comprising a paramagnetic metal ion bound to a complex, said complex comprising:
a) a chelator; and
b) a blocking moiety covalently attached to said chelator which binds in at least a first coordination site of said metal ion and which is capable of interacting with a target substance such that the exchange of water in at least said first coordination site is increased.
7. A MRI agent comprising
a) a paramagnetic metal ion capable of binding n coordination atoms, wherein said metal ion is bound to a chelator such that said metal ion has coordination atoms at $(n-1)$ or $(n-2)$ coordination sites of said metal ion; and
b) a blocking moiety covalently attached to said chelator that hinders the rapid exchange of water in the remaining coordination site or sites,
wherein said blocking moiety is capable of interacting with a target substance, such that the exchange of water at the remaining coordination site or sites is increased.

8. A MRI agent having the formula comprising:



wherein

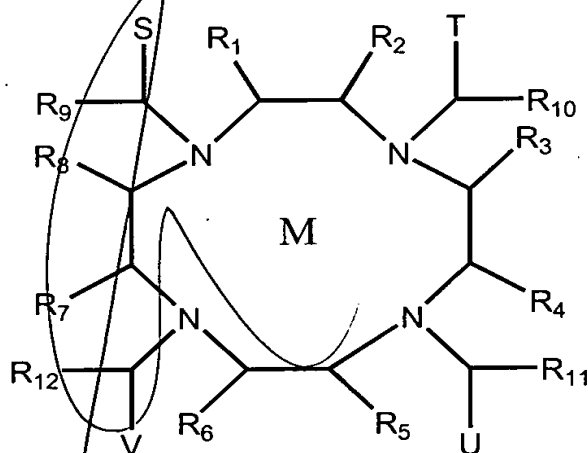
M is a paramagnetic metal ion selected from the group consisting of Gd(III), Fe(III), Mn(II), Yt(III), Cr(III) and Dy(III);

A, B, C and D are either single bonds or double bonds;

W, X, Y and Z are -OH, -COO-, -CH₂OH or -CH₂COO-;

R₁ - R₁₂ are hydrogen, alkyl, substituted alkyl, phosphorus moiety, or a blocking moiety; wherein at least one of R₁ - R₁₂ is a blocking moiety.

9. A MRI agent having the formula comprising:



wherein

M is a paramagnetic metal ion selected from the group consisting of Gd(III), Fe(III), Mn(II), Yt(III), Cr(III) and Dy(III);

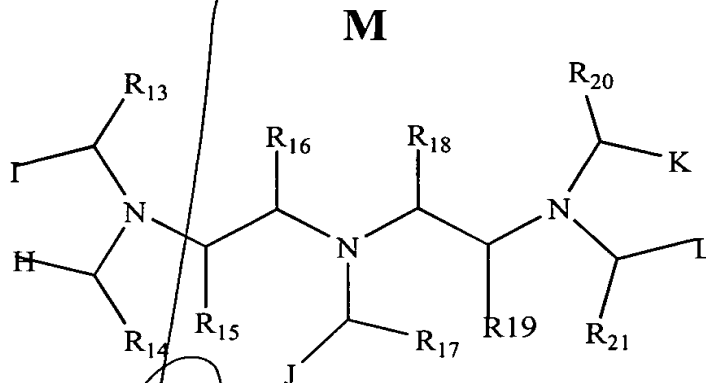
A, B, C, and D are either single or double bonds;

S, T, U and V are -OH, -COO-, -CH₂OH, -CH₂COO-, or a blocking moiety;

R₁ - R₁₂ are hydrogen, alkyl, substituted alkyl, or phosphorus moiety;

wherein at least one of S, T, U or V is a blocking moiety.

10. A MRI agent having the formula comprising:



wherein

M is a paramagnetic metal ion selected from the group consisting of Gd(III), Fe(III), Mn(II), Yt(III), Cr(III) or Dy(III);

H, I, J, K and L are -OH, -COO-, -CH₂OH, -CH₂COO-, or a blocking moiety;

R₁₃ - R₂₁ are hydrogen, alkyl, substituted alkyl, phosphorus moiety or a blocking moiety;

wherein at least one of R₁₃ - R₂₁, H, I, J, K or L is a blocking moiety.

11. A method of magnetic resonance imaging of a cell, tissue or patient comprising administering an MRI agent according to claim 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10 to a cell, tissue or patient and rendering a magnetic resonance image of said cell, tissue or patient.